

# PATENT SPECIFICATION

NO DRAWINGS

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## COMPLETE SPECIFICATION

### Improvements in or relating to Cleaning and Polishing Compositions for Metal Surfaces

We, DELU-FABRIK HANS BECKER & Co., of Gartenstrasse 12, Bad Honnef/Rhein, Germany, a Kommanditgesellschaft organised and existing under the laws of the Federal Republic of Germany, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

Cleaning agents are known for treating precious metal surfaces, particularly silver surfaces, which have become soiled by tarnishing and/or other external influences. These known cleaning agents generally consist of aqueous and, if required, thickened potassium cyanide solutions, sodium thiosulphate and hyposulphite solutions, liquid ammonia solutions or thiourea solutions, which are made neutral or alkaline and contain no free acid.

Cleaning agents are also known which are made acid and contain thiourea or, in order to treat non-precious metals, sulphamic acid and its salts.

Furthermore, a cleaning agent for precious metal surfaces is also known, based upon thiourea and also including an amount of hydrazine sulphate or hydroxylamine sulphate.

It is common to all these known cleaning agents that they are able to clean a silver or other precious metal surface more or less quickly and more or less effectively. It is not possible, however, by means of these known cleaning agents, to stabilize over long periods of time the bright finish so obtained.

Also, silver protecting agents are known, which serve to provide clean silver surfaces with a protection against tarnishing and preserve the high polish and brightness of

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the clean silver surface, so that this bright silver finish remains over long periods. It is known for this purpose to treat the surfaces of silver articles with thin coatings of transparent lacquers. These methods are relatively expensive to carry out and are less than satisfactorily effective where, because of rough handling in use, such coatings may readily become damaged, for example in hotels and restaurants. These difficulties are not shown by the recently published chemical agents for obtaining an effective tarnish protection, which contain *n*-alkane-1-thiol compounds. Even with these agents, however, a protection against tarnishing which is stable for a certain time is only achieved if the agents are used as rapidly as possible after cleaning the silver surfaces.

In any case, two operations have always been necessary, namely a completely effective cleaning and a treatment against tarnishing. These have had to be carried out, as far as possible, continuously and successively and moreover without traces of one agent being allowed into contact with the other agent and also without the clean silver surface becoming attacked in the meantime, during drying. It can be readily seen that, with such numerous conditions, satisfactory results can only be achieved with considerable effort.

It has now been found that the previous disadvantages are avoided and the desired cleaning and protection effects can be achieved simultaneously in a technically simple way, by treating precious metal surfaces and particularly silver surfaces with a cleaning and polishing agent giving tarnish protection according to the invention, which includes 3—10% by weight of a *n*-alkane-1-thiol, the alkane being a straight chain

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radical containing from 12 to 20 carbon atoms, in combination with 10 to 40% by weight of an alkyl-aryl-polyglycol ether as a wetting agent, contained in a 0.5 to 3% by weight sulphuric acid solution.

Preferably the *n*-alkane-1-thiol is lauryl mercaptan and the alkyl-aryl-polyglycol ether contains 8 to 10 mols of the ether oxide in the molecule. It may be desirable to include, as a solubilizer 3 to 12% by weight of a primary, preferably isopropyl alcohol, and as a cleaner phosphated organic ammonium compounds, such as those available on the market under the Trade Mark "Sorban H", in an amount of 1 to 5% by weight.

It is also desirable to include a water-soluble perfume. A material must be selected which does not exert any negative, deactivating effect, either on the cleaning components present or on any emulsifier which may be included. Perfumes of this kind are preferably included in amounts from 1 to 5% by weight.

To obtain paste-like cleaning and polishing agents according to the invention, the usual thickening agents are added, for example methyl cellulose or alginates, which are compatible with dilute sulphuric acid solutions. Colouring agents can also be included if desired in the pastes and also in the baths and other compositions according to the invention. For commercial reasons, a blue colouring agent is preferably included in the cleaning and polishing solutions.

A preferred aqueous solution of the agent has the following composition:

	by weight
Water	57.75%
Thiourea	6.6 %
40 Sulphuric acid (d=1.86)	1.65%
Lauryl Mercaptan	6.0 %
Isopropanol	4.0 %
Lilac perfume	2.0 %
Alkylaryl polyglycol ether	20 %
45 "Sorban H"	2 %
Colouring agent	trace.

This was used to clean silver articles, contaminated with food residues from which the major contaminants has been removed by simple wiping, by immersion for a time of 15 to 20 seconds. After thorough rinsing in clear water, the articles were then dried in the usual way, with an ordinary hand cloth. They had an excellent high polish which had not diminished after twelve weeks.

In the same bath according to the invention, three pieces of silver measuring 15×3 cm having a light-brown tarnish film were immersed for 20 to 25 seconds at room

temperature. The pieces were then removed, thoroughly rinsed with clear water and dried with a soft cloth. All the pieces had mirror-bright surfaces. After storing at room temperature and in a normal atmosphere for twelve weeks, the appearance of the surfaces had not changed. By comparison, untreated pieces showed a brown tarnish after a short time. For testing for any attack on the silver, one of the pieces was treated for eight hours at room temperature in the above-described bath. After rinsing and drying, this piece showed a high gloss finish and no loss in weight, which indicated that the silver had not been attacked, as otherwise the surface would have been dark and pitted. Alteration of the silver under normal conditions of use with the bath according to the invention is thus reliably excluded.

#### WHAT WE CLAIM IS:—

1. A cleaning and polishing agent which includes 3 to 10% by weight of a *n*-alkane-1-thiol, the alkane being a straight chain radical containing from 12 to 20 carbon atoms, in combination with 10 to 40% by weight of an alkyl - aryl - polyglycol ether as a wetting agent, contained in a 0.5 to 3% by weight sulphuric acid solution.
2. An agent according to claim 1, in which the *n*-alkane-1-thiol is lauryl mercaptan.
3. An agent according to claim 1 or 2 which also includes 2 to 12% by weight of a primary alcohol as a solubilizer.
4. An agent according to claim 3, in which the alcohol is isopropanol.
5. An agent according to any preceding claim, which also includes 1 to 5% by weight of a phosphate-containing organic ammonium compound as a cleaner.
6. An agent according to any preceding claim, which includes 1 to 5% by weight of a water-soluble perfume.
7. An agent according to any preceding claim, which includes 6.6% by weight thiourea.
8. An agent according to any preceding claim, which is in the form of an aqueous solution.
9. An agent according to any of claims 1 to 7, which is in the form of a paste.
10. A cleaning and polishing agent as described in the foregoing Example.

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